

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application of:
Gerrit Jäger and Stefan Spahr

June 7, 2001

Filed: Even Date Herewith

Title: BICYCLE HUB

Hon. Commissioner of Patents and Trademarks
United States Patent and Trademark Office
Washington, D.C. 20231

Sir:

AMENDMENT VERSION WITH MARKINGS TO SHOW CHANGES MADE

Words added are shown with a double underline underneath the words added and deletions
are shown with a strikeout through the word deleted

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1. A hub for bicycles and similar contrivances, having the like comprising:
a hub axle,
a hub shell rotatably mounted relative to said hub axle by means of at least two roller bearings,
~~whereby~~ at least two of said roller bearings are being arranged adjacent to one another at an essentially narrow a substantially small spacing,
~~and whereby~~ said roller bearings each ~~comprise~~ comprising roller bodies, ~~each~~ said roller bodies being arranged at a predetermined distance to one another.

Claims 2-18 have been cancelled. Claims 19 - 55 are newly entered but are based upon the original claims 2- 16 filed in the PCT application as is shown by the claim correspondence chart presented herein.

19. The hub according to claim 1 further comprising:
a rotator rotatably mounted relative to said hub axle by means of at least one roller bearing,
and
a freewheel device disposed between said rotator and said hub shell.
20. The hub according to claim 1 wherein the roller bodies of all roller bearings are arranged in bearing cages at predetermined distances.

21. The hub according to claim 1 wherein said roller bearings comprise deep groove ball bearings.
22. The hub according to claim 1 wherein said roller bearings comprise needle bearings.
23. The hub of claim 21 or 22, wherein the roller bearings comprise seals against dust or water and are maintenance free.
24. The hub according to claim 1 wherein at least one of said roller bearings is mounted as a floating bearing, the fitting accuracy of said floating bearing being between 0.02 mm and 0.5 mm.
25. The hub according to claim 1 wherein at least one of said roller bearings is mounted as a floating bearing, the fitting accuracy of said floating bearing being between 0.05 mm and 0.15 mm.
26. The hub of claims 24 or 25, wherein two outer bearings for bearing the hub shell are floating bearings.
27. The hub according to claim 1 wherein said hub axle is hollow and generally cylindrically shaped and an outer surface of said hub axle comprises at least one stop directly abutting up against one of said roller bearings.

28. The hub according to claim 1 wherein said hub is detachable without the use of tools.
29. The hub according to claim 1 wherein said rotator is removable without the use of tools.
30. The hub according to claim 1 wherein a right or left adapter ring is provided on at least on one end of said hollow hub axle said ring being screwed or slipped onto said hub axle.
31. The hub according claim 1 wherein at least one sealing means is disposed between said hub axle and said hub shell.
32. The hub according to claim 19 wherein said freewheel device comprises two gear rings which are arranged substantially concentric to said hub axle, and wherein the toothed surfaces of the gear rings are urged towards one another by a pre-tensioning device, whereby at least one of the gear rings is retained as a floating gear ring.
33. The hub according claim 30 wherein said freewheel device comprises at least one ratchet pawl.
34. The hub according claim 19 wherein at least one sealing means is arranged between said rotator and said hub shell.
35. The hub according claim 34 wherein at least one sealing means comprises at least one elastomer sealing element.

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36. The hub according claim 34 wherein at least one sealing means comprises at least one labyrinth seal.

37. A hub for bicycles and the like, comprising:

a hollow hub axle,

a hub shell rotatably mounted relative to said hub axle by means of roller bearings,

said roller bearings each comprising roller bodies, said roller bodies being arranged at a predetermined distance to one another; and

said hub axle comprising a first diameter section for being inserted into a bicycle frame drop-out; and said hub axle further comprising a second diameter section arranged in the central section of the hub axle, said second diameter section comprising an outer diameter and an inner diameter, whereby the inner diameter of said second diameter section is equal to or larger than the outer diameter of said first diameter section.

38. The hub according to claim 37 further comprising:

a rotator rotatably mounted relative to said hub axle by means of at least one roller bearing,
and

a freewheel device disposed between said rotator and said hub shell.

39. The hub according to claim 37 wherein the roller bodies of all roller bearings are arranged in bearing cages at predetermined distances.

40. The hub according to claim 37 wherein said roller bearings comprise deep groove ball bearings.
41. The hub according to claim 37 wherein said roller bearings comprise needle bearings.
42. The hub of claim 40 or 41, wherein the roller bearings comprise seals against dust or water and are maintenance free.
43. The hub according to claim 37 wherein at least one of said roller bearings is mounted as a floating bearing, the fitting accuracy of said floating bearing being between 0.02 mm and 0.5 mm.
44. The hub according to claim 37 wherein at least one of said roller bearings is mounted as a floating bearing, the fitting accuracy of said floating bearing being between 0.05 mm and 0.15 mm.
45. The hub of claims 43 or 44, wherein two outer bearings for bearing the hub shell are floating floating bearings.
46. The hub according to claim 37 wherein said hub axle is hollow and generally cylindrically shaped and an outer surface of said hub axle comprises at least one stop directly abutting up against one of said roller bearings.

47. The hub according to claim 37 wherein said hub is detachable without the use of tools.
48. The hub according to claim 37 wherein said rotator is removable without the use of tools.
49. The hub according to claim 37 wherein a right or left adapter ring is provided on at least on one end of said hollow hub axle said ring being screwed or slipped onto said hub axle.
50. The hub according claim 37 wherein at least one sealing means is disposed between said hub axle and said hub shell.
51. The hub according to claim 38 wherein said freewheel device comprises two gear rings which are arranged substantially concentric to said hub axle, and wherein the toothed surfaces of the gear rings are urged towards one another by a pre-tensioning device whereby at least one of the gear rings is retained as a floating gear ring.
52. The hub according claim 49 wherein said freewheel device comprises at least one ratchet pawl.
53. The hub according claim 38 wherein at least one sealing means is arranged between said rotator and said hub shell.
54. The hub according claim 53 wherein at least one sealing means comprises at least one elastomer sealing element.

55. The hub according claim 53 wherein at least one sealing means comprises at least one
labyrinth seal.

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